

**SCHEMATIC  
DIAGRAM**

**CRUMAR<sup>®</sup>**

*Musical Instruments*

**mod.**

**915**

<sup>1</sup>→○ K 2.1

FEMALE CONNECTOR SYMBOL (es. K2.1)

○←

PLUG IN CONNECTOR SYMBOL

○→

OUTPUT SIGNAL (TO DWG...)

○←

INPUT SIGNAL (FROM DWG...)

○

TEST POINT (TP...)

●

CONNECTING POINT (ON p.c.b.)

ALL resistors 1/4 unless otherwise indicated

ALL tabswitches shown in OFF position

ALL keyswitches shown in OFF position

See part list for component part numbers



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**SCHEMATIC  
DIAGRAM**

*mod.*  
**915**

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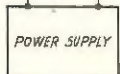
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### BLOCK DIAGRAM

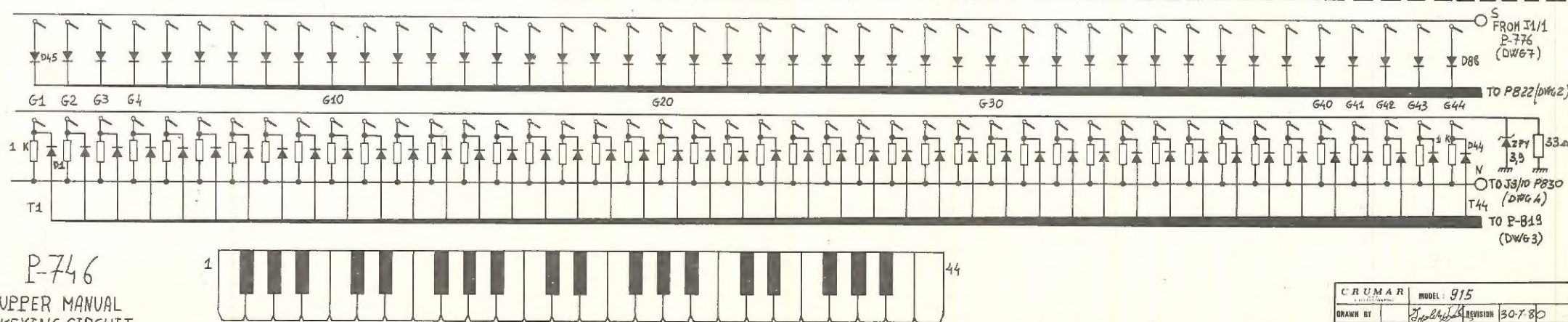
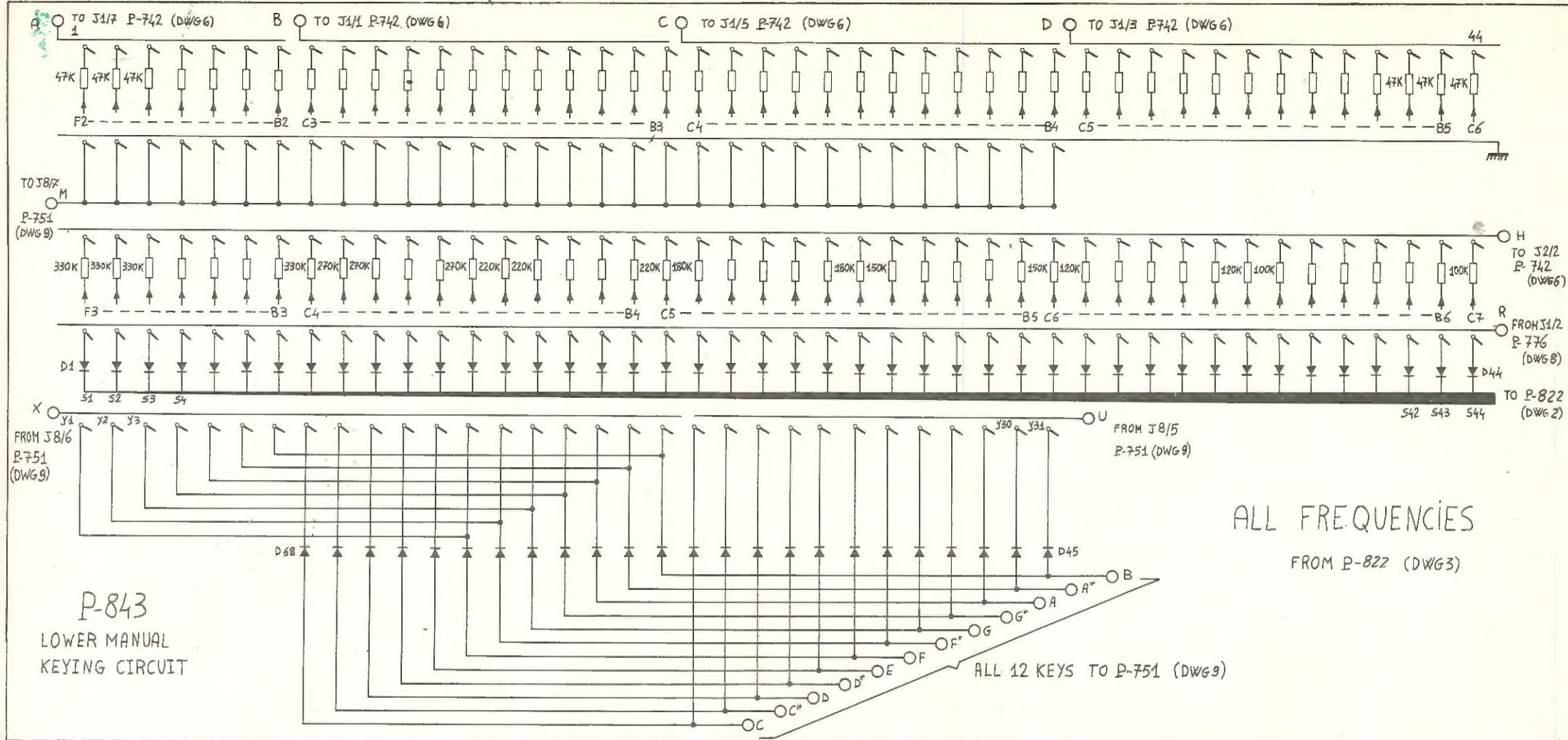


BLOCK DIAGRAM FOR LED SECTION



GND = BLACK-WHITE CABLE  
+5V = RED-BLUE CABLE





P-843



P-746



CURMAR		MODEL: 915	
DRAWN BY	Appley	REVISION	30-7-80
DESIGNED BY		DATE	

DWG 1A

QUESTO DISEGNO E PROPRIETA' PRIVATA E NON PUO' ESSERE COPIATO, RIPRODOTTO



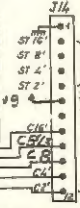
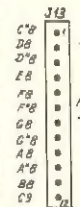
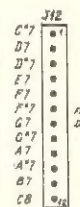
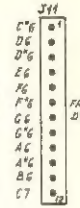
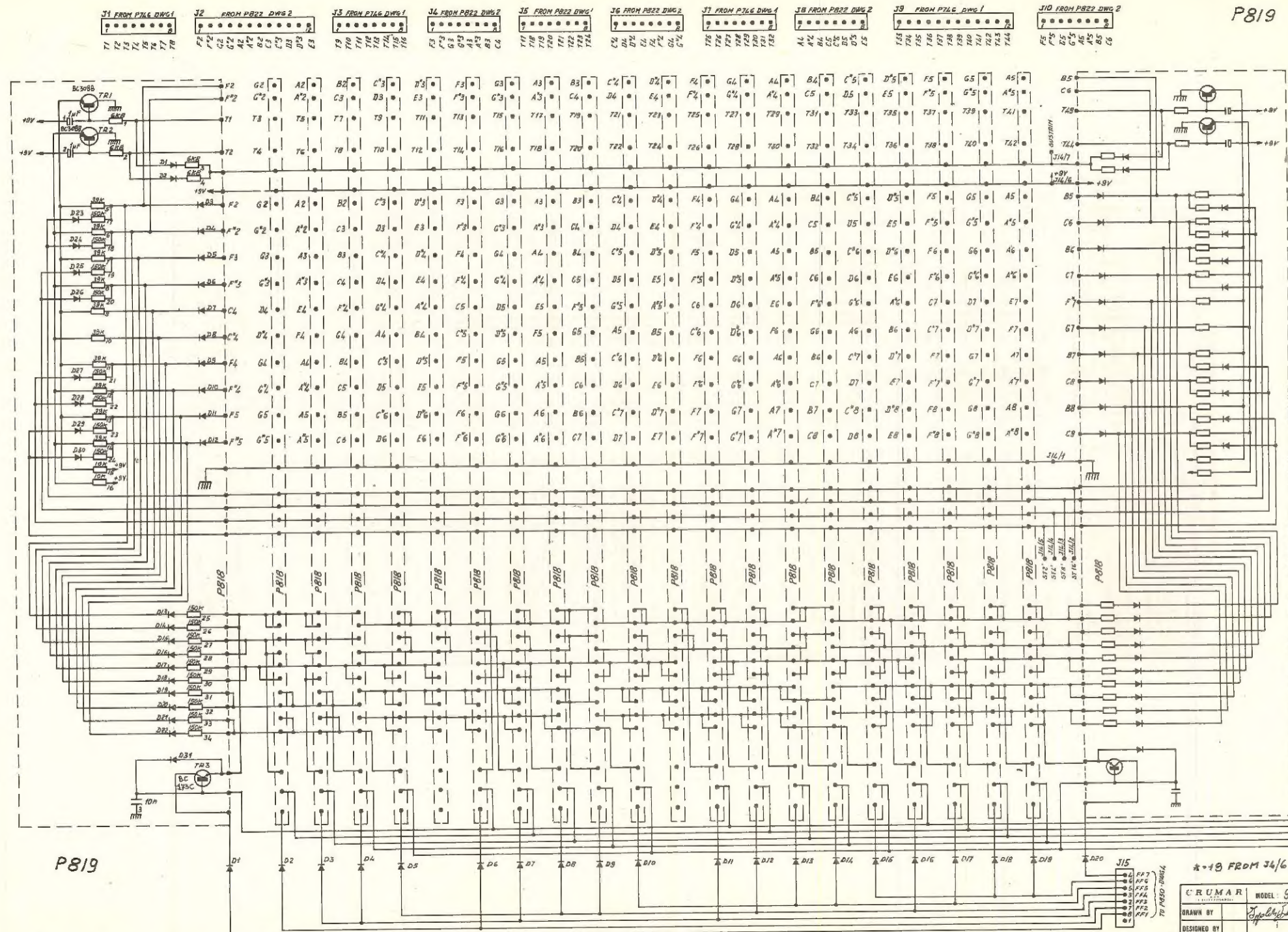








P819



P819

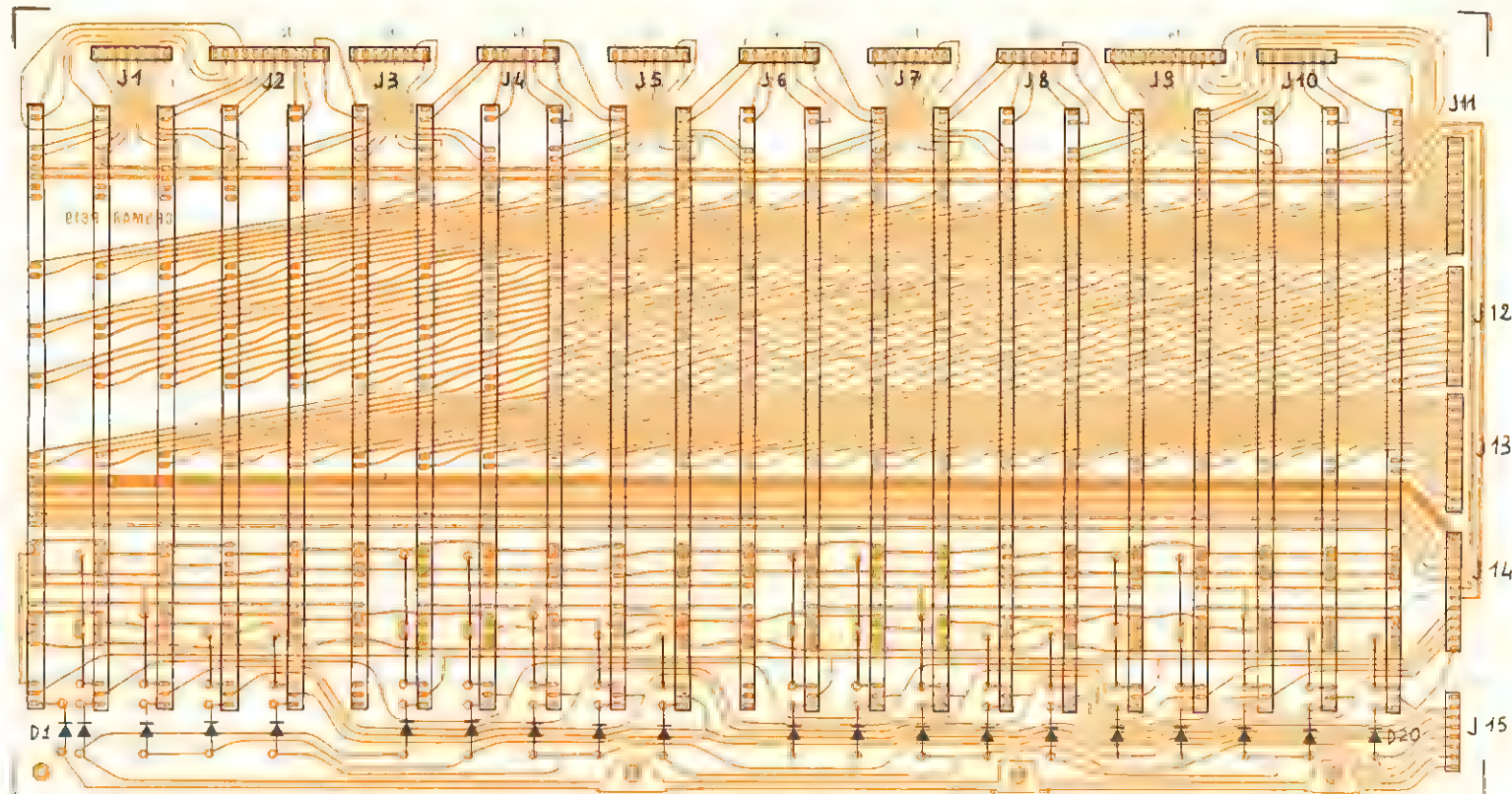
\*-19 FROM J4/6 P830 DWG 4

C.R.U.M.A.R.		MODEL: 915
DRAWN BY: <i>[Signature]</i>	REVISION: 30-7-80	DATE: <i>[Blank]</i>
DESIGNED BY: <i>[Blank]</i>		

DWG 3



P-819



P-818

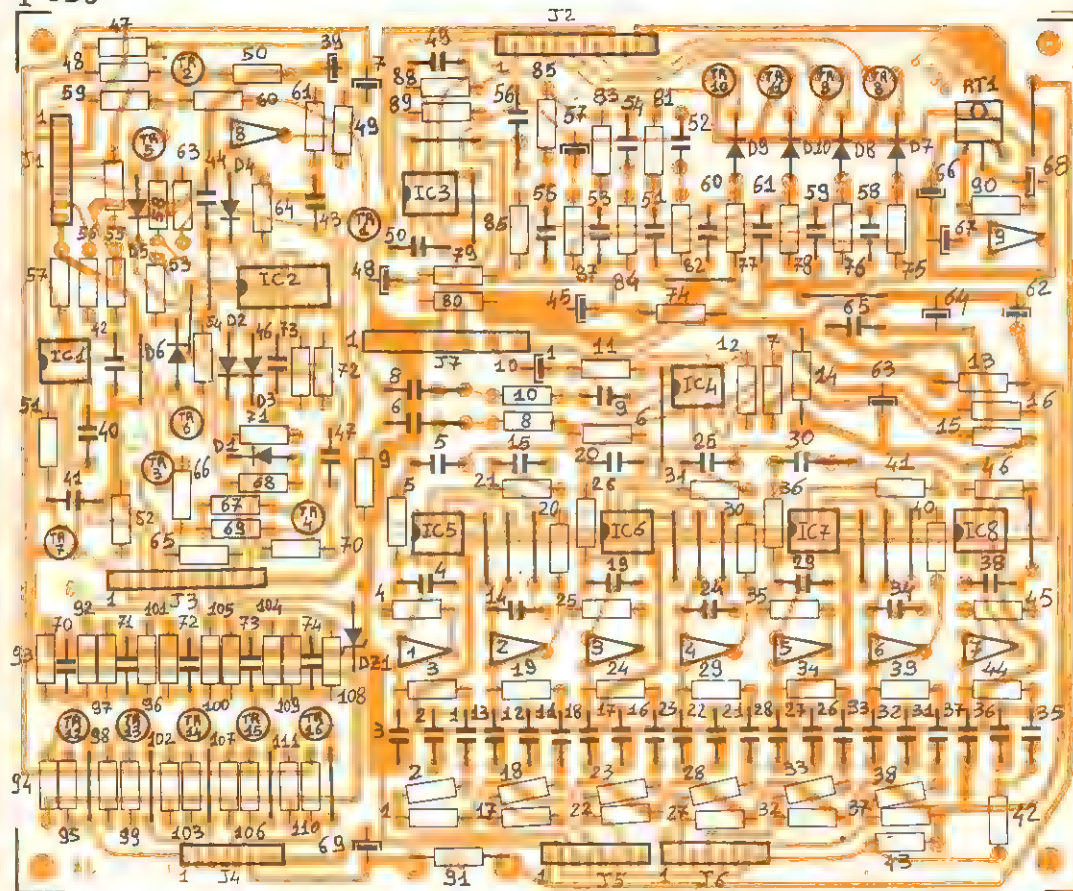


CRUMAR		MODEL 915	
DRAWN BY	J. J. J.		REVISION 30 7 80
DESIGNED BY	J. J. J.		DATE





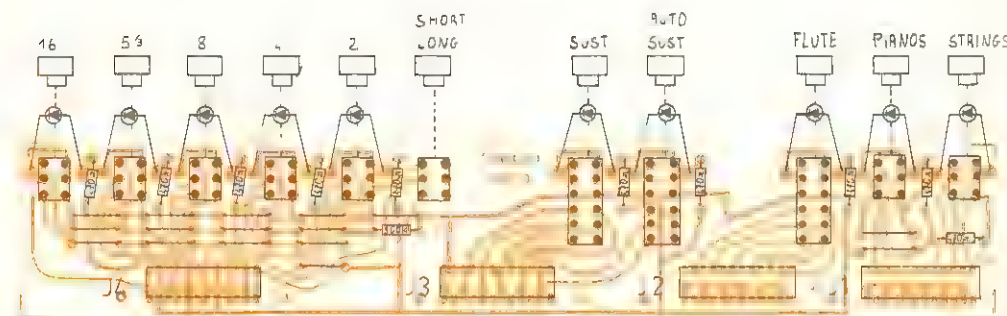
P-830



PERCUSSION

SUSTAIN

PHASER

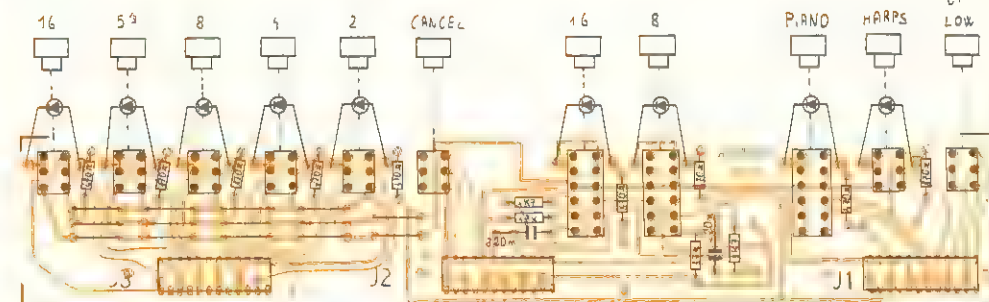


P-789

FLUTES

STRINGS

PIANOS

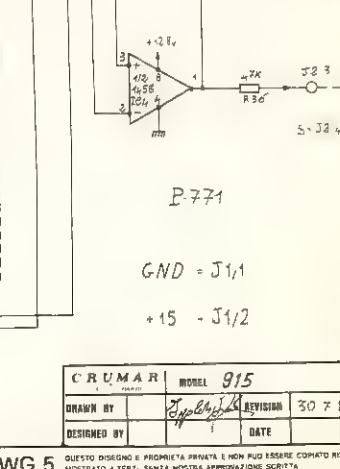
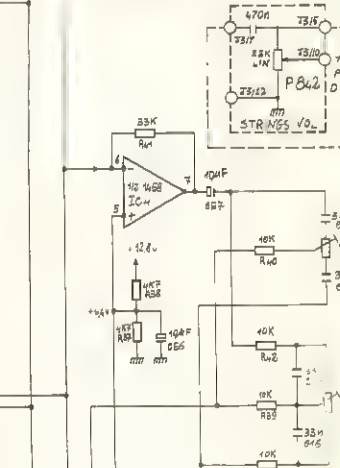
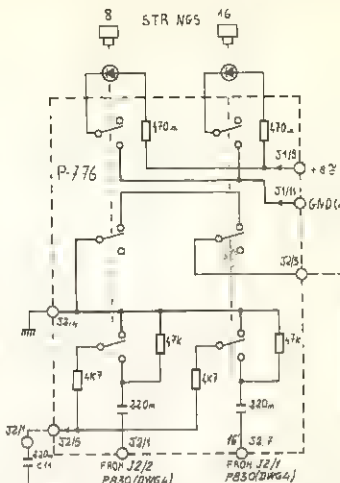
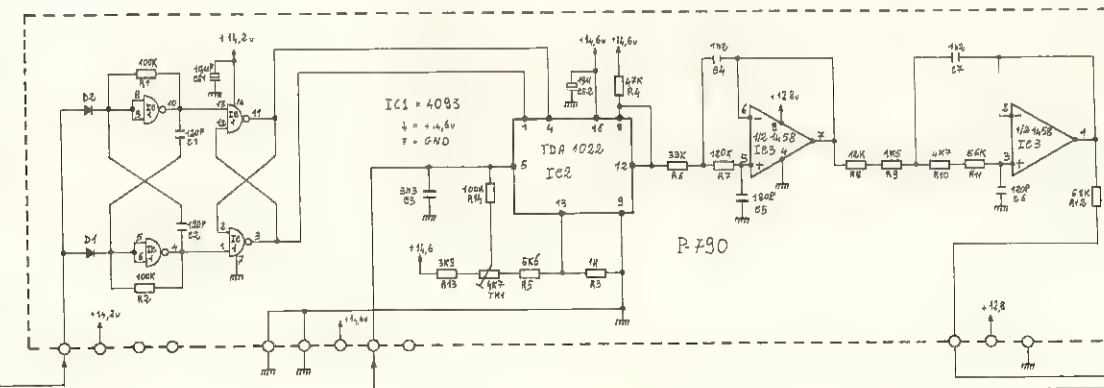
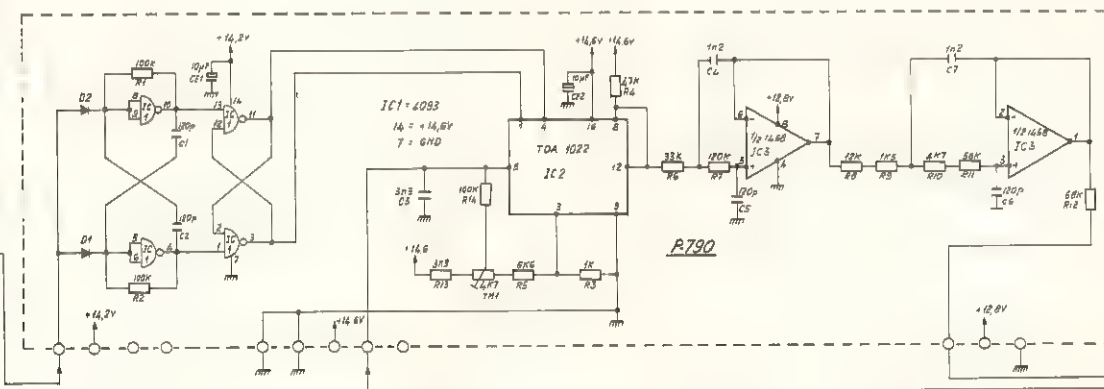
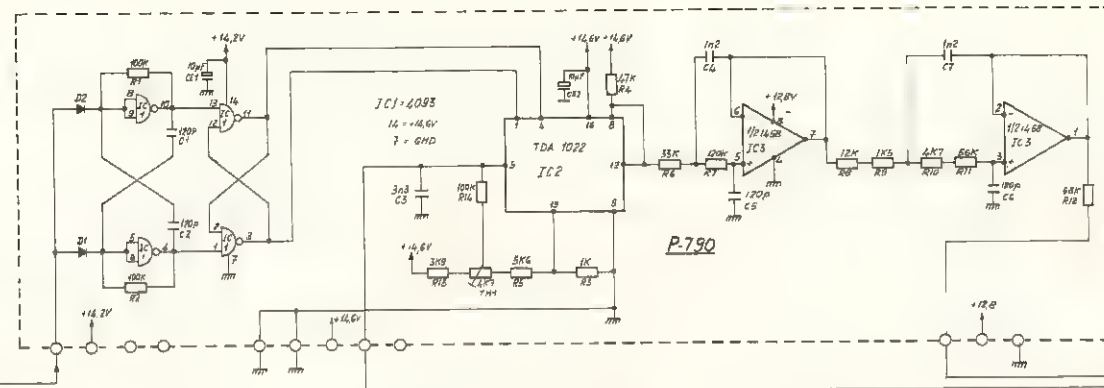
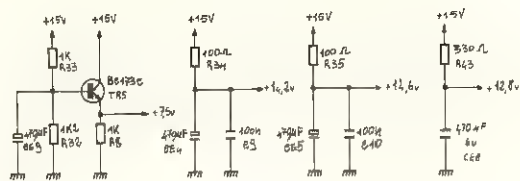


P-776

CRUMAR		MODEL 915	
DRAWN BY	REVISION	DATE	30780
DESIGNED BY			

DWG 4A

QUANTO PIU' COME LA PROPRIETA' PARATA E' NON PUO' ESSERE COPIATO RIMPROVATO O MODIFICATO O TESTO SENZA AUTORIZZAZIONE SCRITTA



P.771

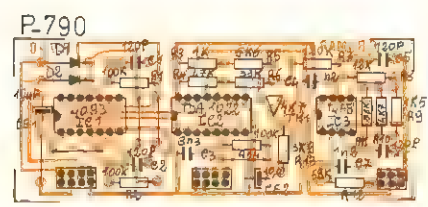
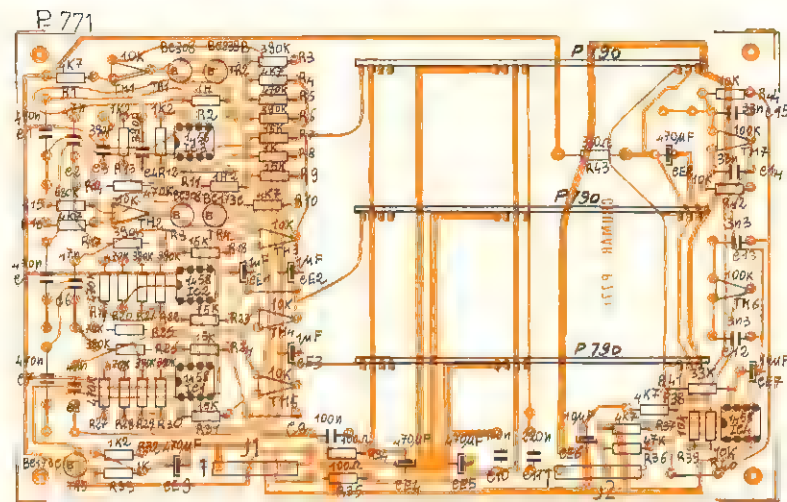
P.771

GND = J1.1

+15 = J1.2

CRUMAR	MODEL 915
DRAWN BY	REVISION 30 x 80
DESIGNED BY	DATE





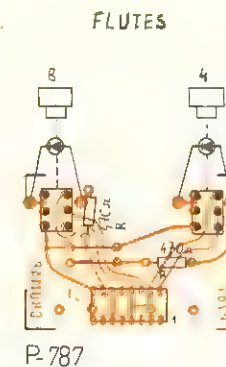
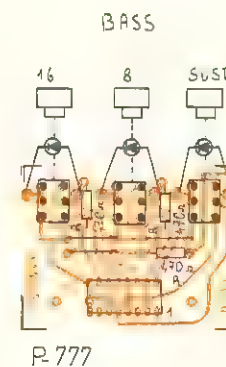
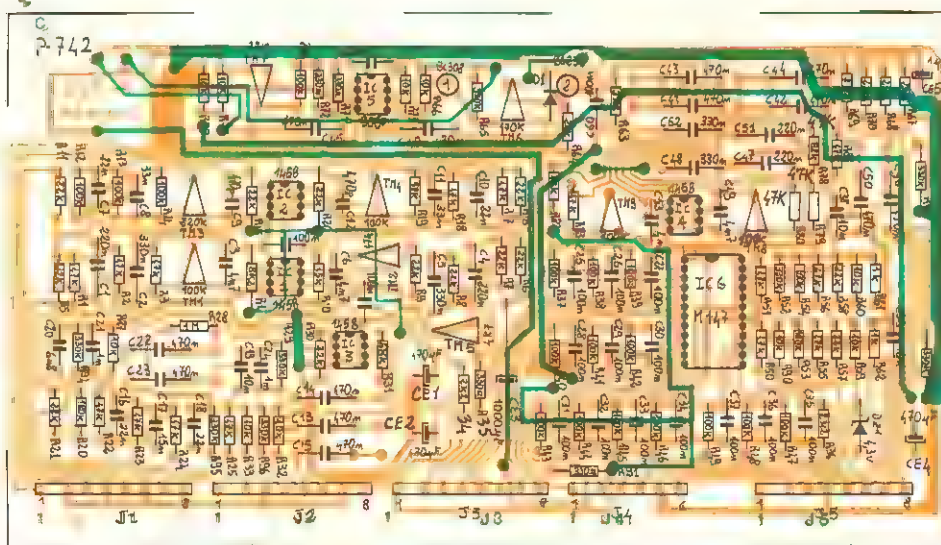
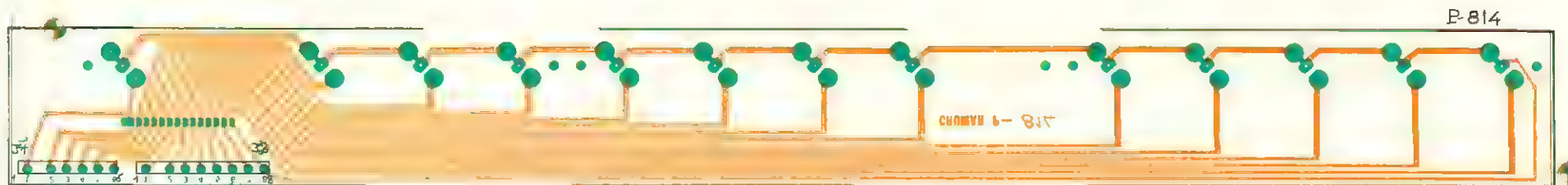
CRUMAR		MODEL 915	
DRAWN BY		REVISION	
DESIGNED BY		DATE	

DWG 5A

DIRITTO DISEGNO E PROPRIETÀ PRIVATA. È NON PUÒ ESSERE COPIATO, RIPRODOTTO, MOSTRATO A TERZI, SENZA NOSTRA APPROVAZIONE SCRITTA.



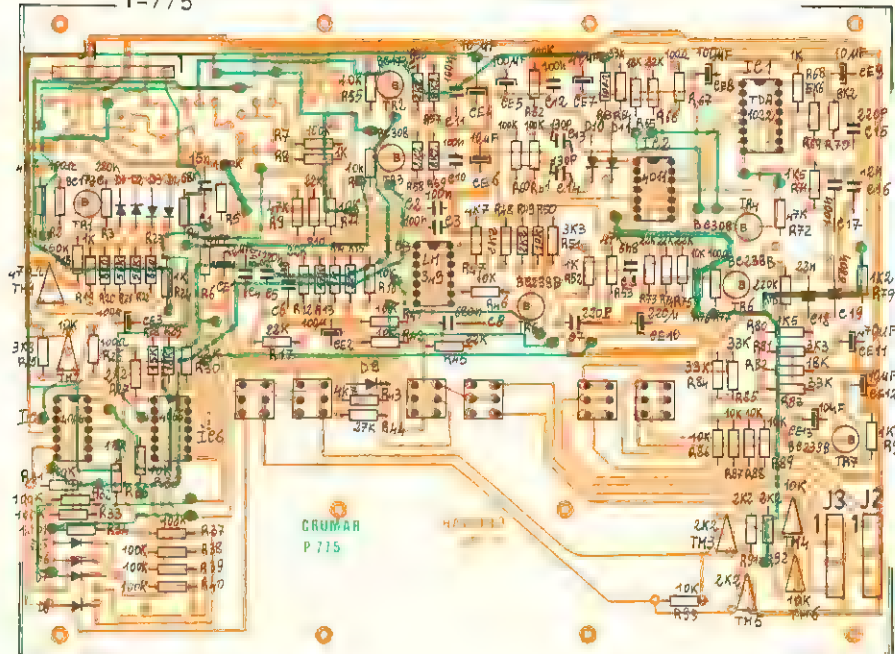








P-775



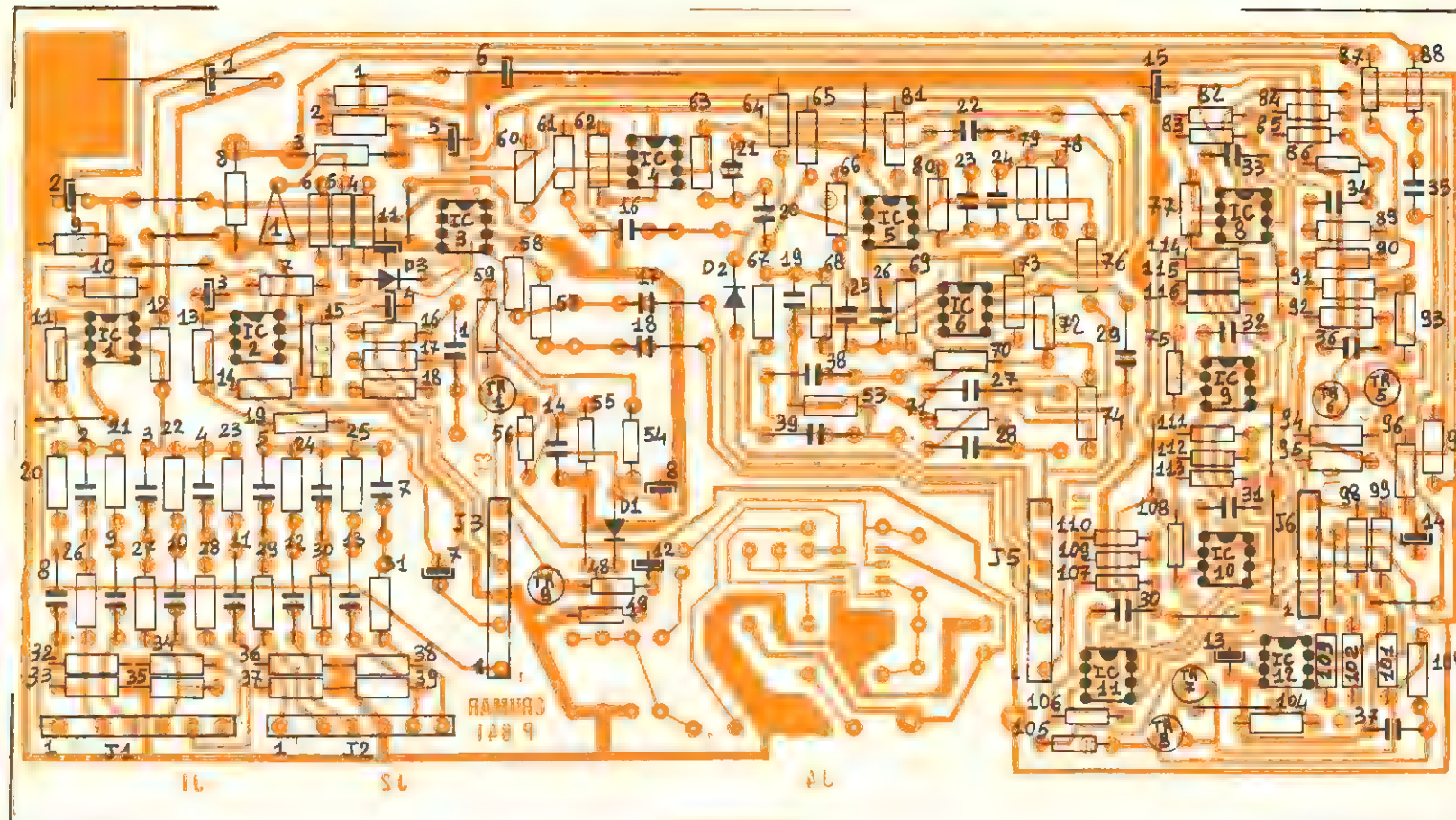
CRUMAR		MODEL 915	
DRAWN BY	<i>Suppl...</i>	REVISION	30 1-80
DESIGNED BY		DATE	

QUESTO DISEGNO È PROPRIETÀ PRIVATA E NON PUÒ ESSERE COPIATO RIPRODOTTO





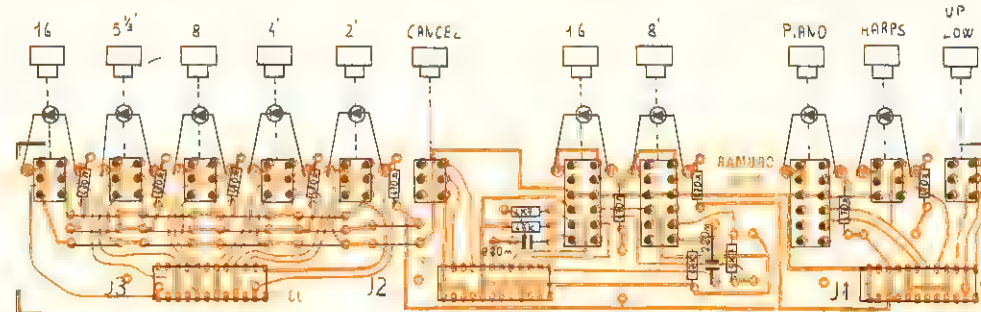
P-841



FLUTES

STRINGS

PIANOS

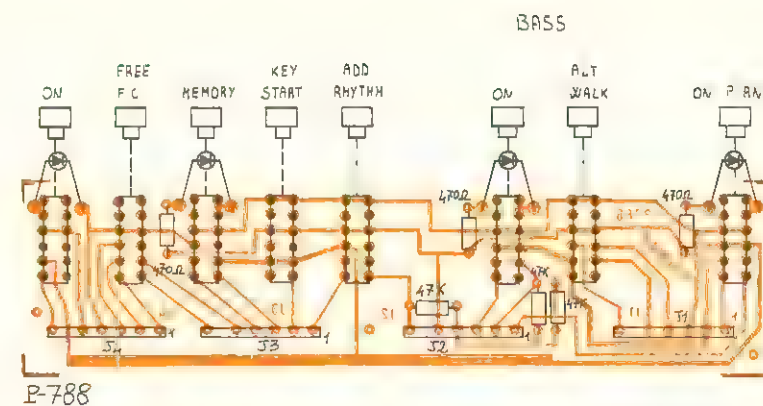
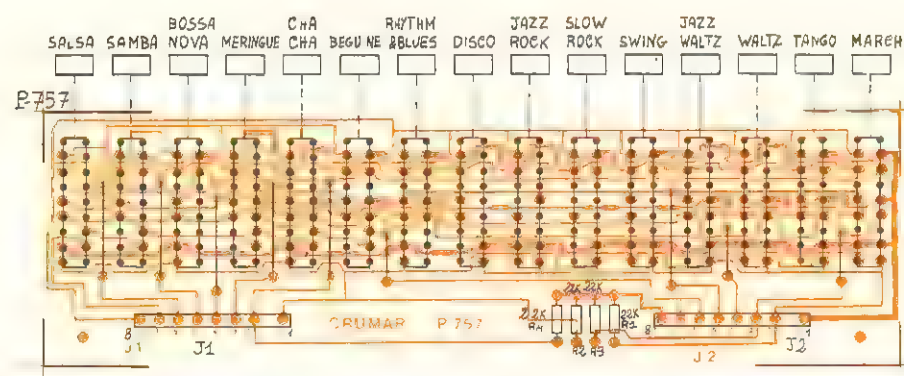
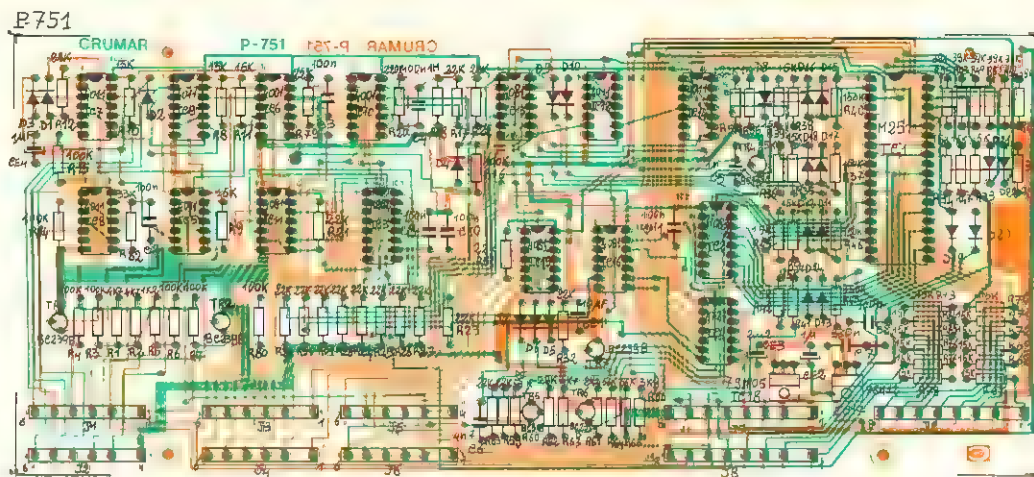


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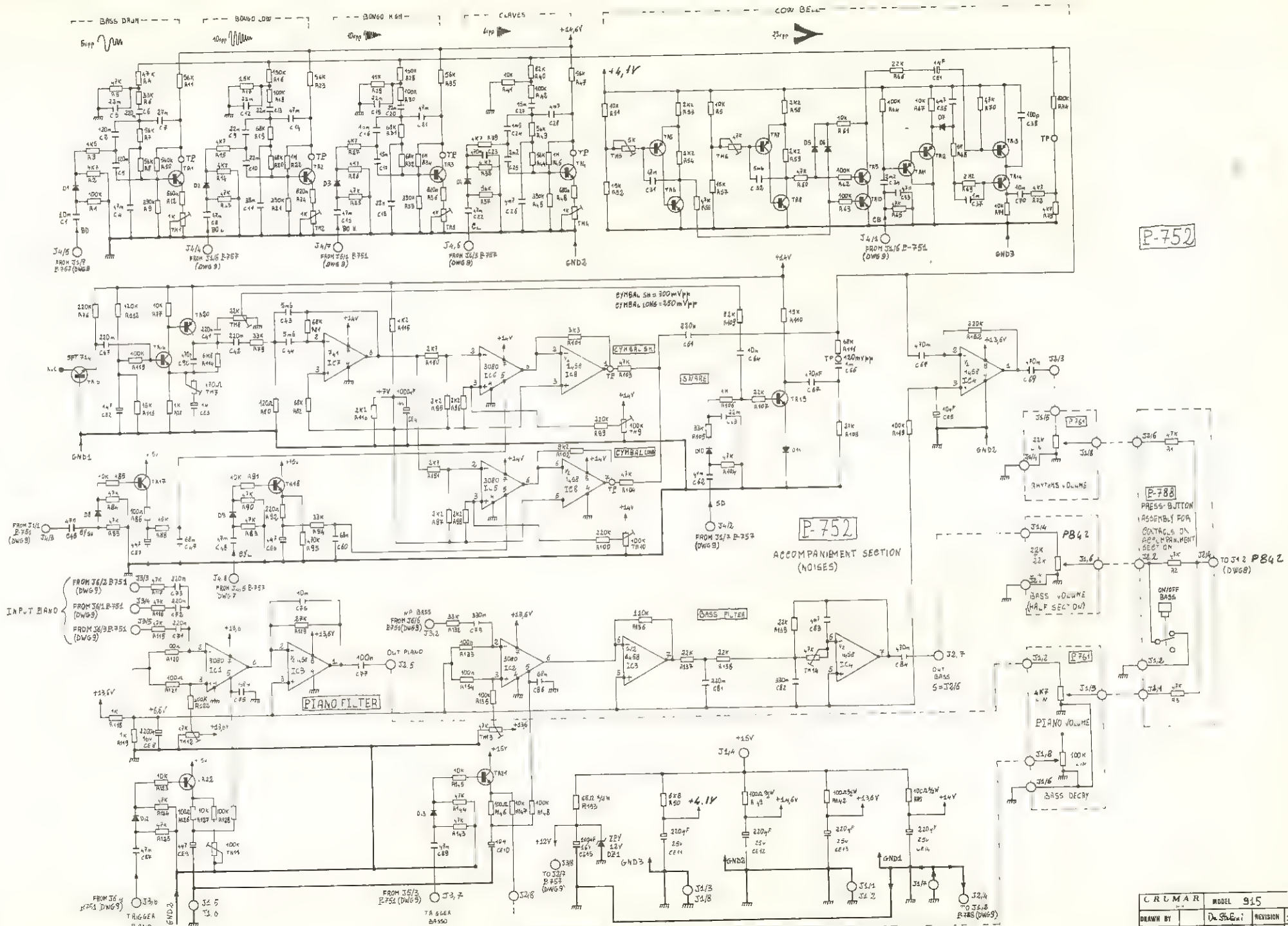
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DRAWN BY	5/1/77	REVISION	30-7-80
DESIGNED BY		DATE	





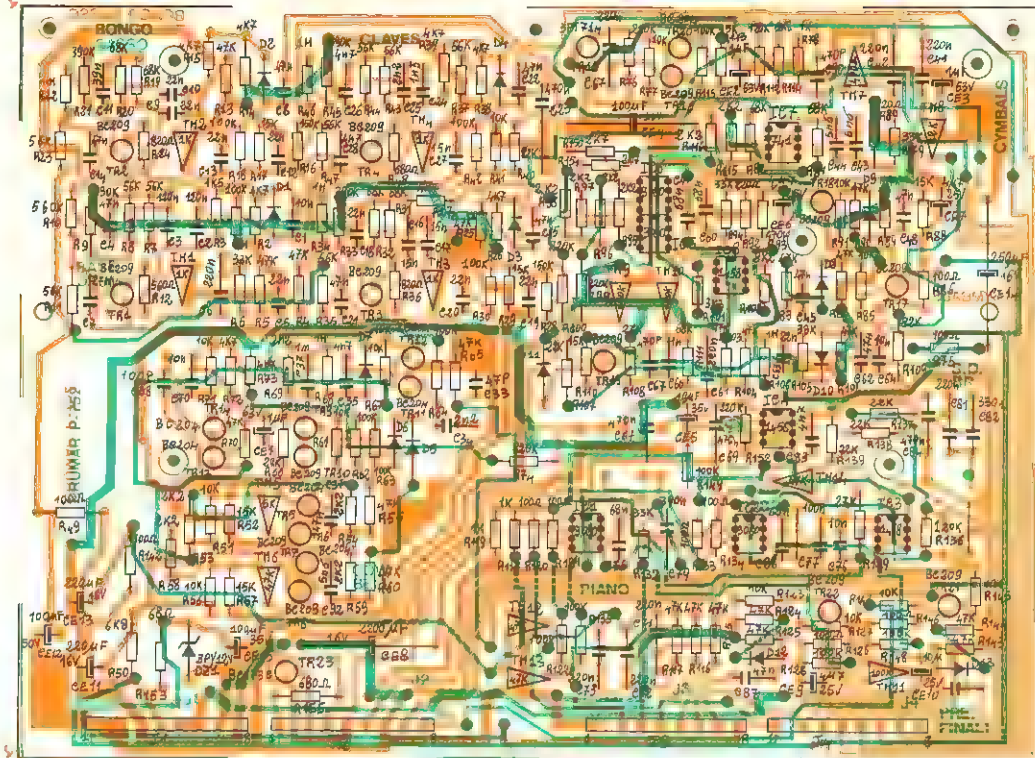


CRUMAR	MODEL 915
DRAWN BY	REVISION 307.50
DESIGNED BY	DATE





P-752

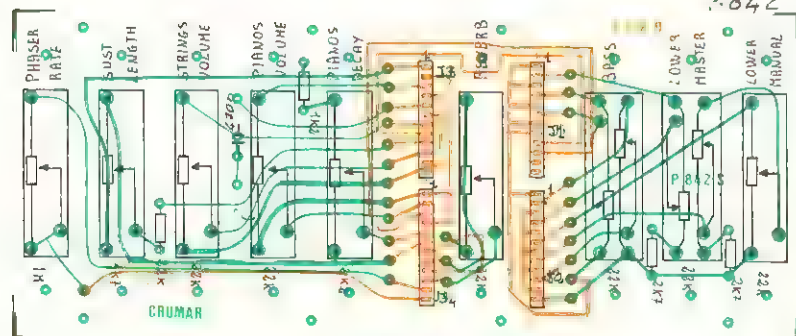


P-761

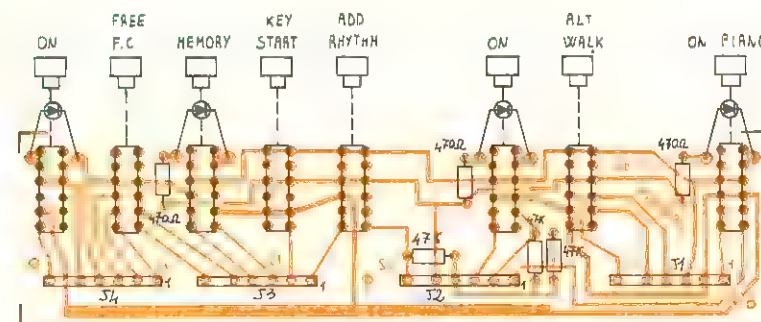


TEMPO

P-842



BASS



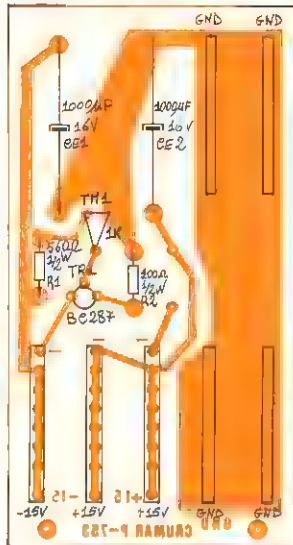
P-788

CRUMAR	MODEL 915
DRAWN BY	REVISION 50-780
DESIGNED BY	DATE

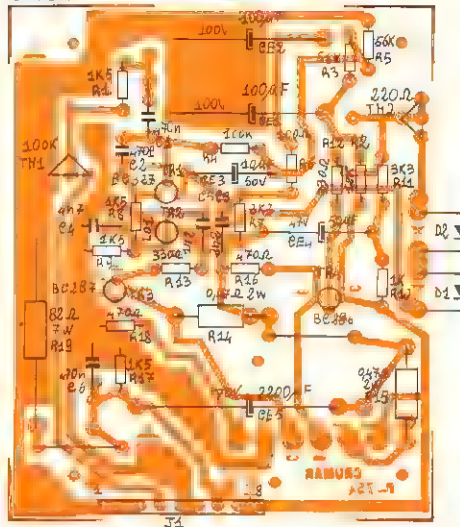




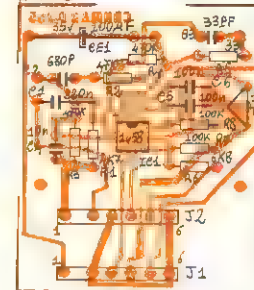
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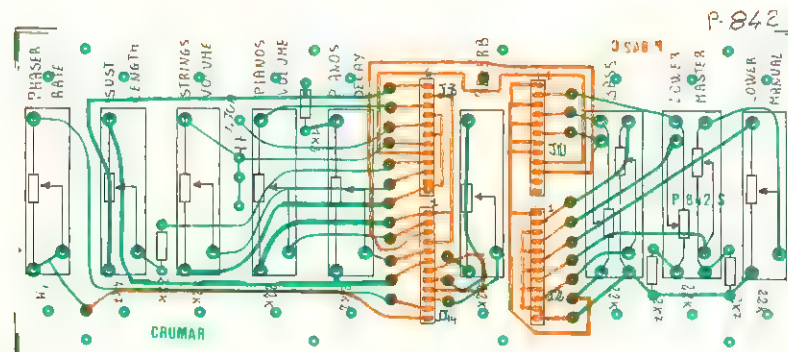
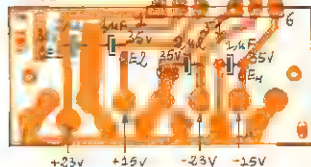
P-754



P-755



P-763



CRUMAR		MODEL 915	
DRAWN BY	J. J. J.		REVISION
DESIGNED BY	J. J. J.		DATE
30-7-80			

## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
<b>L.M. KEYING CIRCUIT (DWG1)</b>			
P-843	Complete with Components		978002437
D1 ÷ D68	Diodes	BA130	65000001
<b>U.M. KEYING CIRCUIT (DWG1)</b>			
P-746	Complete with Components		978002435
D1 ÷ D88	Diodes	BA130	65000001
<b>MASTER OSCILLATORS AND DIVIDERS (DWG2)</b>			
P-822	Complete with Components		978002413
IC1	Voltage reference	741	68000059
IC2	Master Oscillator	7LLS221	68000058
IC3	Dual J-K Master Slave Flip-Flop with 4027 Set and Reset	4027	68000089
IC4	T.O.S.	MK50240	68000009
IC5 ÷ IC16	Divider	HB4727	68000041
TR1	Buffer	BC173C	62120003
TR2	Voltage Reference	BC286	62110002
TR3 ÷ TR14	Buffer	BC308B	62210001
RT1	Voltage Regulator	78L05	62000031
D1 ÷ D264	Diodes	1N4149	65000007
<b>MODULES FOR ELECTRONIC KEYBOARD (DWG3)</b>			
P-818	Complete with Components		978002409
TR1 - TR2	Gate	BC308B	62210001
TR3	Preamplifier	BC173C	62120003
D1 ÷ D31	Diodes	1N4149	65000007
<b>ELECTRONIC KEYBOARD (DWG3)</b>			
P-819	Complete with Components		978002410
D1 ÷ D20	Diodes		65000001
<b>FLUTE-PERCUSSION ACTIVATING (DWG4)</b>			
P-776	Complete with Components		978002355
<b>FLUTE FILTER - MIXER STRINGS AND PERC. ENVELOPE (DWG4)</b>			
P-830	Complete with Components		978002421
IC1	Voltage Reference and Perc. Envelope	358	68000093

## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
IC2	Mixer	4011	68000034
IC3 ÷ IC7	Filter Preamplifier	1458	68000053
IC8	Filter Preamplifier	741	68000141
TR1 - TR4	Buffer	BC173C	62100003
TR2	Voltage Regulator	BC286	62110002
TR7	Buster Power	BC286	62110002
TR3 - TR5 - TR6	Gate	BC308	62210001
TR12 ÷ TR16	Buffer	BC173C	62100003
TR8 ÷ TR11	Preamplifier	BC173C	62100003
RT1	Voltage Regulator	LM317T	62110034
DZ1	Diode Zener	ZPY4,7V	67000002
D1 ÷ D10	Diodes	BA130	65000001
<b>DELAY LINES (DWG5)</b>			
P-771	Complete with Components		978002350
IC1 ÷ IC3	Oscillators	1458	68000107
IC4	Preamplifier	1458	68000107
TR1 - TR2	Limiter	BC308B	62210001
TR2 - TR4	Limiter	BC239B	62120001
TR5	Emitter Follower	BC173C	62120003
<b>DELAY LINES (DWG5)</b>			
P-790	Complete with Components		978002369
IC1	Quad 2-Input NAND Schmitt Trigger	4093	68000050
IC2	Delay-Line	TDA1022	68000084
IC3	Filters	1458	68000107
D1 ÷ D2	Diodes	BA130	65000001
<b>PEDAL BASS FILTER AND LOWER MANUAL MIXER (DWG6)</b>			
P-742	Complete with Components		978002316
IC1 - IC2	Filter Preamplifier	1458 or 4558	68000062
IC3	Preamplifier	1458 or 4558	68000062
IC4	Mixer	1458 or 4558	68000062
IC5	V.C.A.	3080	68000066
IC6	Pedal Frequency Generator	M147	68000087
TR1	Gate	BC308	62210001
TR2	Gate	BC173B	62120001
DZ1	Diode Zener	ZPY4,3V	67000075
D1	Diode	BA130	65000001



## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
<b>PEDAL-BOARD KEYSWITCHES (DWG6)</b>			
P-814	Complete with Components		978002397
<b>BASS CONTROLS (DWG6)</b>			
P-777	Complete with Components		978002356
<b>VOLUME CONTROLS (DWG6)</b>			
P-842	Complete with Components		978002357
<b>LOWER MANUAL FLUTE CONTROLS (DWG6)</b>			
P-787	Complete with Components		978002366
D1 ÷ D2	Diodes	BA130	65000001
<b>ROTATING SOUND SISTEM (DWG6)</b>			
P-775	Complete with Components		978002354
IC1	Delay Line	TDA1022	68000084
IC2	Quad 2-Input NAND Buffered B Series Gate	4011	68000034
IC3 1/2	Filters	LM349	68030132
IC3 1/2	Oscillator	LM349	68030132
IC5-IC6	Analog Switch	4066	68000094
TR7	Mixer	BC239B	62120001
TR5	Switch	BC239B	62120001
TR6	Emitter Follower	BC239B	62120001
TR1 ÷ TR2	Emitter Follower	BC173C	62100003
TR3	Emitter Follower	BC308B	62210001
TR4	Current Source	BC308B	62210001
D1 ÷ D11	Diodes	BA130	65000001
<b>PHASER-MIXER AND FINAL PRE-AMPLIFIERS (DWG8)</b>			
P-841	Complete with Components		978002434
IC1 ÷ IC2	Mixer Preamplifier	1458	68000053
IC5 - IC6	Filter Preamplifier	1458	68000053
IC3	Modulator	3080	68000066
IC4	Preamplifier	741	68030141
IC8 ÷ IC11	V.C.A.	3094	68000098

## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
IC12	Oscillator	3094	68000098
TR1	Emitter Follower	BC173C	62120003
TR6 - TR9	Preamplifier	BC173C	62120003
TR5	Preamplifier	BC308	62210001
TR7 - TR8	Oscillator	BC308	62210001
D1 ÷ D3	Diodes	BA130	65000001
<b>ACCOMPANIMENT SECTION (LOGIC) (DWG9)</b>			
P-751	Complete with Components		978002324
IC1	Accompaniment Unit	M251	68000109
IC2	T.O.S.	M083	68070129
IC3	Rhythms Memory	M252	68040130
IC4	Divider	HBF4727	68000041
IC6-IC10	Quad 2-Input NOR Gate	4001	68000020
IC12-IC14	Quad 2-Input NAND Buffered Series Gate	4011	68000034
IC11-IC13	Quad 2-Input AND Buffered B Series Gate	4081	68000019
IC15-IC16	Quad 2-Input AND Buffered B Series Gate	4081	68000019
IC17	Voltage Regulator	78M12	62110027
IC18	Voltage Regulator	79M05	62110029
TR1-TR2	Switch	BC239B	62120001
TR6-TR7	Buffer Preamplifier	BC239B	62120001
TR4	Buffer	BC173C	62120003
TR5	Buffer Preamplifier	BC308B	62210001
D1 ÷ D22	Diodes	BA130	65000001
<b>PRESS-BUTTON ASSEMBLY FOR RHYTHMS ON ACCOMP. SECTION (DWG9)</b>			
P-757	Complete with Components		978002330
<b>PRESS-BUTTON ASSEMBLY FOR CONTROLS ON ACCOMP. SECTION (DWG9)</b>			
P-788	Complete with Components		978002367

## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
P-761	<b>VOL. REVERB - VOL. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS (DWG9)</b>		
	Complete with Components		978002338
P-752	<b>ACCOMPANIMENT SECTION (LOGIC) (DWG10)</b>		
	Complete with Components		978002325
IC1-IC2-IC5	Modulator (V.C.A.)	3080	68000066
IC6	Cymbal filter	741	68000059
IC7	Preamplifier	1458	68000107
IC3-IC4-IC8	Bass Drum Generation	BC209	62120001
TR1	Bongo Low Generation	BC209	62120001
TR2	Bongo High Generation	BC209	62120001
TR3	Claves Generation	BC209	62120001
TR4	Cow Bell Oscillator	BC209	62120001
TR6-8-9-10	Cow Bell Oscillator	BC204	62210001
TR5	Cow Bell Oscillator	BC204	62210001
TR7	Cow Bell Oscillator	BC204	62210001
TR11-12	Cow Bell Gate	BC204	62210001
TR13-14	Cow Bell Preamplifier	BC204	62210001
TR16	Preamplifier	BC209	62120001
TR20	Preamplifier	BC204	62210001
TR17	Cymbalsh. Envelope	BC209	62120001
TR22	Envelope	BC209	62120001
TR21	Envelope	BC209	62120001
TR18	Cymbal Long Envelope	BC209	62120001
TR19	Snare Generation	BC209	62120001
TR15	Noise	SFT714	62210002
TR23	Switch	BC173C	62120003
D1 ÷ D13	Diodes	BA130	65000001
DZ1	Diode Zener	ZPY12V	67000010

**VOL. REVERB - VOL. VIB. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS (DWG10)**

P-761 Complete with Components 978002338

**PRESS-BUTTON ASSEMBLY - FOR CONTROLS ON ACCOMPANIMENT SECTION (DWG10)**

P-788 Complete with Components 978002367

## MODEL 915

## ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
P-753	<b>POWER-SUPPLY FILTERS (DWG10)</b>		
	Complete with Components		978002326
TR1	Lamp Current Regulator	BC287	62110003
P-754	<b>AMPLIFIER (DWG10)</b>		
	Complete with Components		978002327
TR1	Unit Amplifier	BC327	62110007
TR2	Unit Amplifier	L01	62110004
TR3	Unit Amplifier	BC287	62110003
TR4	Unit Amplifier	BC286	62110002
P-755	<b>REVERB (DWG10)</b>		
	Complete with Components		978002328
IC1	Driver And Amplifier	1458	68000107
P-763	<b>POWER SUPPLY (DWG10)</b>		
	Complete with Components		978002341
IC1	Voltage Regulator	7815	62110020
IC2	Voltage Regulator	7915	62110022
PD1 ÷ PD3	Rectifier Bridge	KBL04	66000006



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